

## MODULE SPECIFICATION

Module code	
Module title in Polish	<b>Podstawy projektowania dróg</b>
Module title in English	<b>Fundamentals of Road Design</b>
Module running from the academic year	<b>2016/2017</b>

### A. MODULE IN THE CONTEXT OF THE PROGRAMME OF STUDY

Field of study	<b>Civil Engineering</b>
Level of qualification	<b>First cycle</b> <i>(first cycle, second cycle)</i>
Studies profile	<b>Academic</b> <i>(academic/practical)</i>
Mode of study	<b>Full-time</b> <i>(full-time / part-time)</i>
Specialism	<b>Road Construction</b>
Organisational unit responsible for module delivery	<b>The Department of Transport Engineering</b>
Module co-ordinator	<b>Anna Chomicz-Kowalska, PhD, Eng.</b>
Approved by	<b>Marek Iwański, Professor</b>

### B. MODULE OVERVIEW

Module type	<b>Core module</b> <i>(core/programme-specific/elective HES*)</i>
Module status	<b>Compulsory module</b> <i>(compulsory / non-compulsory)</i>
Language of module delivery	<b>English</b>
Semester in the programme of study in which the module is taught	<b>Semester 6</b>
Semester in the academic year in which the module is taught	<b>Summer semester</b> <i>(winter / summer)</i>
Pre-requisites	<b>None</b> <i>(module code/module title, where appropriate)</i>
Examination required	<b>No</b> <i>(yes / no)</i>
ECTS credits	<b>2</b>

Mode of instruction	lectures	classes	laboratories	project	others
<b>Total hours per semester</b>	<b>30</b>			<b>15</b>	

\* elective HES – elective modules in the Humanities and Economic and Social Sciences

### C. LEARNING OUTCOMES AND ASSESSMENT METHODS

<b>Module aims</b>	The aims of the module are as follows: learning design issues for new, renovated, and rebuilt sections of roads outside developed areas; learning the principles of shaping a cross section of roads, the course of road alignment in a plan and profile; the co-ordination of a road alignment in a plan and profile; familiarising students with safety regulations concerning road traffic.
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Module outcome code	Module learning outcomes	Mode of instruction (l/c/lab/p/ others)	Corresponding programme outcome code	Corresponding discipline-specific outcome code
W_01	A student knows the principles of designing road elements in a plan, a longitudinal profile, and cross section.	l/p	B_W09 B_W12	T1A_W02 T1A_W03 T1A_W04 T1A_W05 T1A_W07
W_02	A student is knowledgeable about the applied calculation methodology of various elements concerning a road network.	l/p	B_W10	T1A_W03 T1A_W04 T1A_W05 T1A_W07 T1A_W08
W_03	A student recognises and names particular road network elements.	l/p	B_W12	T1A_W02 T1A_W03 T1A_W04 T1A_W05 T1A_W07
U_01	A student can select design parameters concerning the elements of a situational plan, a longitudinal profile, and a cross section of a road.	p	B_U14	T1A_U03 T1A_U04 T1A_U05 T1A_U14 T1A_U16
U_02	A student can utilise norms; a student can also conduct the calculations concerning a route according to guidelines.	p	B_U13	T1A_U05 T1A_U07 T1A_U11 T1A_U15 T1A_U16
U_03	A student is able to design the elements of a road plan and profile.	p	B_U12 B_U14	T1A_U01 T1A_U03 T1A_U04 T1A_U05 T1A_U07 T1A_U08 T1A_U09 T1A_U14 T1A_U15 T1A_U16
K_01	A student can work individually.	p	B_K01	T1A_K01 T1A_K03 T1A_K04
K_02	A student is responsible for the reliability of the obtained results.	p	B_K02	T1A_K02 T1A_K05 T1A_K07

**Module content:**

1. Topics to be covered in the lectures

No.	Topics	Module outcome code
1	Technical and functional classification of roads. Basic project parameters. Project speed and the operating speed (project element dependent on these values).	W_03
2	Road cross sections. Cross section components. The sections of single- and dual-carriageways (concerning straight sections).	W_01 W_03
3	The principles of dimensioning a cross section. The principles of designing slopes for cross section elements of a road. Clearance line.	W_01 W_03
4	The principles of designing roads in a plan. Road elements in a plan. The principles of designing straight sections. The principles of selecting the values horizontal curve radiuses from the safety conditions of safe and comfortable drive on a horizontal curve.	W_01 W_03
5	Selecting the values of radius from the condition of smoothness of connections with respect to the elements of the situational plan. Selecting the radius from the condition of night visibility (the principles of calculating). Broadening a road on a horizontal curve. The principles of calculating the broadening of a single lane.	W_01 W_02
6	The principles of applying and shaping a broadening. A cross section of a road on a horizontal curve (with and without broadening).	W_01 W_03
7	Designing transition curves. The application of a clothoid as a transition curve. Fundamental principles of applying transition curves.	W_01 W_03
8	Selecting clothoid parameters. Safety, constructional, and smoothness of connection conditions.	W_01
9-10	The principles of designing roads in longitudinal section. Design/project elements, road vertical alignments. The principles of designing the sections or vertical alignments with identical inclines. Maximum and minimum inclines, maximum and minimum lengths of sections with identical inclines.	W_01 W_03
11	Convex and concave vertical curves. Selecting the value of minimum and maximum radiuses of vertical curves. The condition of visibility. Selecting minimum values of vertical curve radiuses. The condition of visibility, visibility at night and under the objects; a dynamic condition; the condition of vertical alignment smoothness.	W_01 W_03
12	Visibility assessment on the road. Determining the necessary visibility distances. Visibility distance with respect to a stop. Visibility distance for overtaking. Traffic models. A mathematical record.	W_02
13	Assessing visibility at crossroads.	W_01 W_02 W_03
14	Spatial coordination of road elements of a road in a plan and longitudinal profile.	W_01

2. Topics to be covered in the classes

3. Topics to be covered in the projects

Project number	Topics	Module outcome code
1	Selecting a cross section of a road depending on the project speed, road functions, and the required traffic conditions.	W_01 W_03 U_01 U_02 K_01
2	Setting out the alignment of a road on topographic plan.	W_01

		U_02 U_03 K_01
3	Calculating route elements on a plan. A road curve and transition curves.	W_02 U_01 U_02 U_03 K_01
4	The mileage of the designed road section.	U_03 K_01
5	Designing the course of road alignment in a longitudinal profile.	W_01 U_02 U_03 K_01
6	Calculating the elements of a vertical curve.	W_02 U_02 U_03 K_01
7	Calculating ordinates of the designed vertical alignment concerning road surface.	W_02 K_01
8	Technical description with calculations.	K_01 K_02

### Assessment methods

Module outcome code	Assessment methods <i>(Method of assessment; for module skills – reference to specific project, laboratory and similar tasks)</i>
W_01	A test
W_02	A test
W_03	A test
U_01	Oral defence of a project
U_02	Oral defence of a project
U_03	Oral defence of a project
K_01	Oral defence of a project
K_02	Oral defence of a project

### C. STUDENT LEARNING ACTIVITIES

ECTS summary		
	Type of learning activity	Study time/ credits
1	Contact hours: participation in lectures	<b>30</b>
2	Contact hours: participation in classes	
3	Contact hours: participation in laboratories	
4	Contact hours: attendance at office hours (2-3 appointments per semester)	<b>1</b>
5	Contact hours: participation in project-based classes	<b>15</b>
6	Contact hours: meetings with a project module leader	<b>2</b>
7	Contact hours: attendance at an examination	
8		
9	<b>Number of contact hours</b>	<b>48</b> <i>(total)</i>

10	<b>Number of ECTS credits for contact hours</b> <i>(1 ECTS credit =25-30 hours of study time)</i>	<b>1.6</b>
11	Private study hours: background reading for lectures	<b>2</b>
12	Private study hours: preparation for classes	
13	Private study hours: preparation for tests	<b>2</b>
14	Private study hours: preparation for laboratories	
15	Private study hours: writing reports	
16	Private study hours: preparation for a final test in laboratories	
17	Private study hours: preparation of a project/a design specification	<b>8</b>
18	Private study hours: preparation for an examination	
19		
20	<b>Number of private study hours</b>	<b>12</b> <i>(total)</i>
21	<b>Number of ECTS credits for private study hours</b> <i>(1 ECTS credit =25-30 hours of study time)</i>	<b>0.4</b>
22	<b>Total study time</b>	<b>60</b>
23	<b>Total ECTS credits for the module</b> <i>(1 ECTS credit =25-30 hours of study time)</i>	<b>2</b>
24	<b>Number of practice-based hours</b> <i>Total practice-based hours</i>	<b>26</b>
25	<b>Number of ECTS credits for practice-based hours</b> <i>(1 ECTS credit =25-30 hours of study time)</i>	<b>1.0</b>